

# **Alcohol and Driving**

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Reaching Zero: Actions to Eliminate  
Substance-Impaired Driving

National Transportation Safety Board  
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# Outline

- Some context
- Alcohol chemistry
- Alcohol effects
- A little data
- What can be done?
- What works?
- Effective strategies to move forward

# Context: alcohol in society

- Alcohol has been used for over 7000 years
- Alcohol ingrained into American life
  - US alcohol industry sales over \$100B annually
  - 62% of adults drink, 7% heavy drinkers (4+ drinks 4+/month) NIAAA
  - Alcohol is legal – we tried prohibition and it didn't work
- Driving ingrained into American life
- Result: a cultural clash
- We drink; and we drive
- Very hard to separate the two

# Alcohol chemistry

- Absorbed into the body quickly
- Blood  $\approx$  breath  $\approx$  brain
- BAC: Blood Alcohol Concentration

# BAC chart - women

APPROXIMATE BAC										
Drinks *	BODY WEIGHT IN POUNDS									EFFECT ON PERSON
	90	100	120	140	160	180	200	220	240	
0	.00	.00	.00	.00	.00	.00	.00	.00	.00	ONLY SAFE DRIVING LIMIT
1	.05	.05	.04	.03	.03	.03	.02	.02	.02	IMPAIRMENT BEGINS.
2	.10	.09	.08	.07	.06	.05	.05	.04	.04	DRIVING SKILLS SIGNIFICANTLY AFFECTED.
3	.15	.14	.11	.11	.09	.08	.07	.06	.06	
4	.20	.18	.15	.13	.11	.10	.09	.08	.08	LEGALLY INTOXICATED.  CRIMINAL PENALTIES IN ALL STATES
5	.25	.23	.19	.16	.14	.13	.11	.10	.09	
6	.30	.27	.23	.19	.17	.15	.14	.12	.11	
7	.35	.32	.27	.23	.20	.18	.16	.14	.13	
8	.40	.36	.30	.26	.23	.20	.18	.17	.15	
9	.45	.41	.34	.29	.26	.23	.20	.19	.17	
10	.51	.45	.38	.32	.28	.25	.23	.21	.19	

Drink = 12-oz. beer, 4 oz. wine, 1 oz. 80-proof alcohol

12 oz. beer, 5 oz. wine, 1.5 oz. 80-proof distilled spirits (corrected 5/23/2013)

# BAC chart - men

APPROXIMATE BAC									
Drinks *	BODY WEIGHT IN POUNDS								EFFECT ON PERSON
	100	120	140	160	180	200	220	240	
0	.00	.00	.00	.00	.00	.00	.00	.00	ONLY SAFE DRIVING LIMIT
1	.04	.03	.03	.02	.02	.02	.02	.02	IMPAIRMENT BEGINS.
2	.08	.06	.05	.05	.04	.04	.03	.03	
3	.11	.09	.08	.07	.06	.06	.05	.05	DRIVING SKILLS SIGNIFICANTLY AFFECTED.
4	.15	.12	.11	.09	.08	.08	.07	.06	
5	.19	.16	.13	.12	.11	.09	.09	.08	LEGALLY INTOXICATED.  CRIMINAL PENALTIES IN <u>ALL</u> STATES **
6	.23	.19	.16	.14	.13	.11	.10	.09	
7	.26	.22	.19	.16	.15	.13	.12	.11	
8	.30	.25	.21	.19	.17	.15	.14	.13	
9	.34	.28	.24	.21	.19	.17	.15	.14	
10	.38	.31	.27	.23	.21	.19	.17	.16	

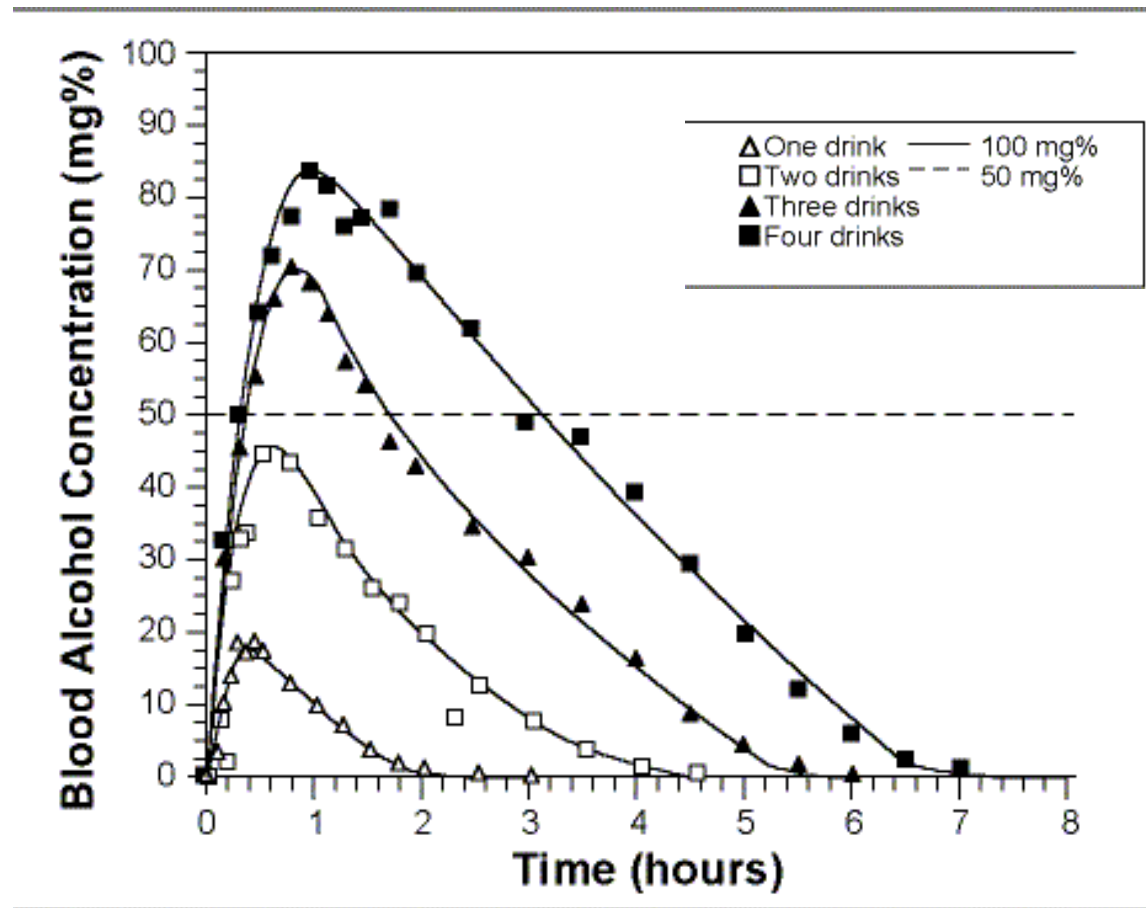
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12 oz. beer, 5 oz. wine, 1.5 oz. 80-proof distilled spirits (corrected 5/23/2013)

# Alcohol effects

- What: central nervous system
  - Processing sensory information, muscle control, short-term memory
  - Divided attention, tracking a target, reaction time
- When: quickly (15 minutes)
  - Some effects begin at lowest measurable BAC
  - No threshold below which there is no impairment
  - Effects increase as BAC increases
- Who:
  - Everyone is impaired at any measurable BAC
  - Amount of impairment varies across individuals (weight, sex, etc.)
- Effects are certain and swift; severity rises with BAC

# Alcohol absorption and metabolism

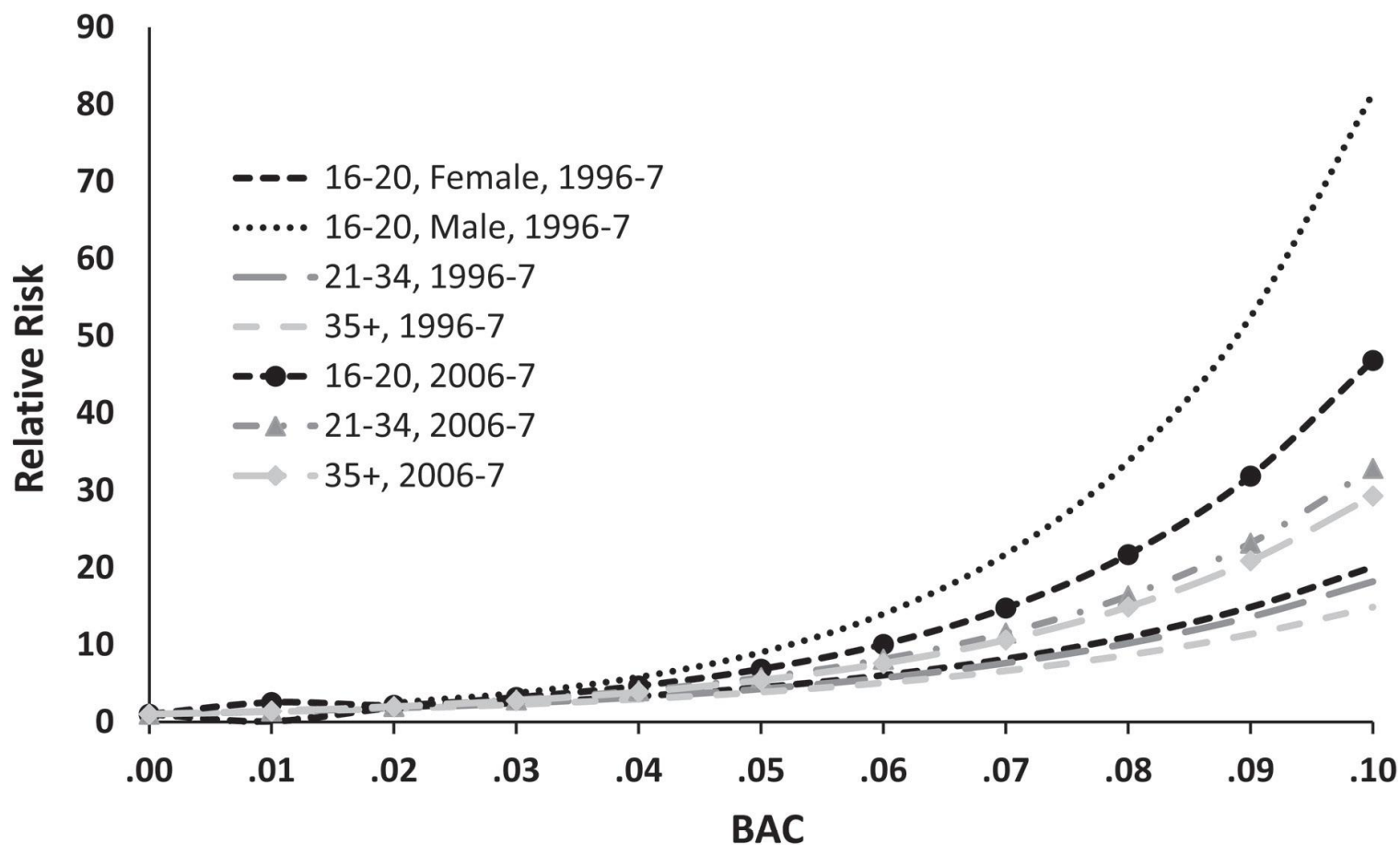




# Consequences of chemistry and effects

- Risk of single-vehicle fatal crashes
  - 0.00 BAC: baseline
  - 0.02-0.04 BAC: 40% higher (1.4 times higher)
  - 0.05-0.09 BAC: 1,100% higher (11 times higher)
  - 0.10-0.14 BAC: 4,800% higher (48 times higher)
  - 0.15 and up BAC: 38,000% higher (380 times higher)

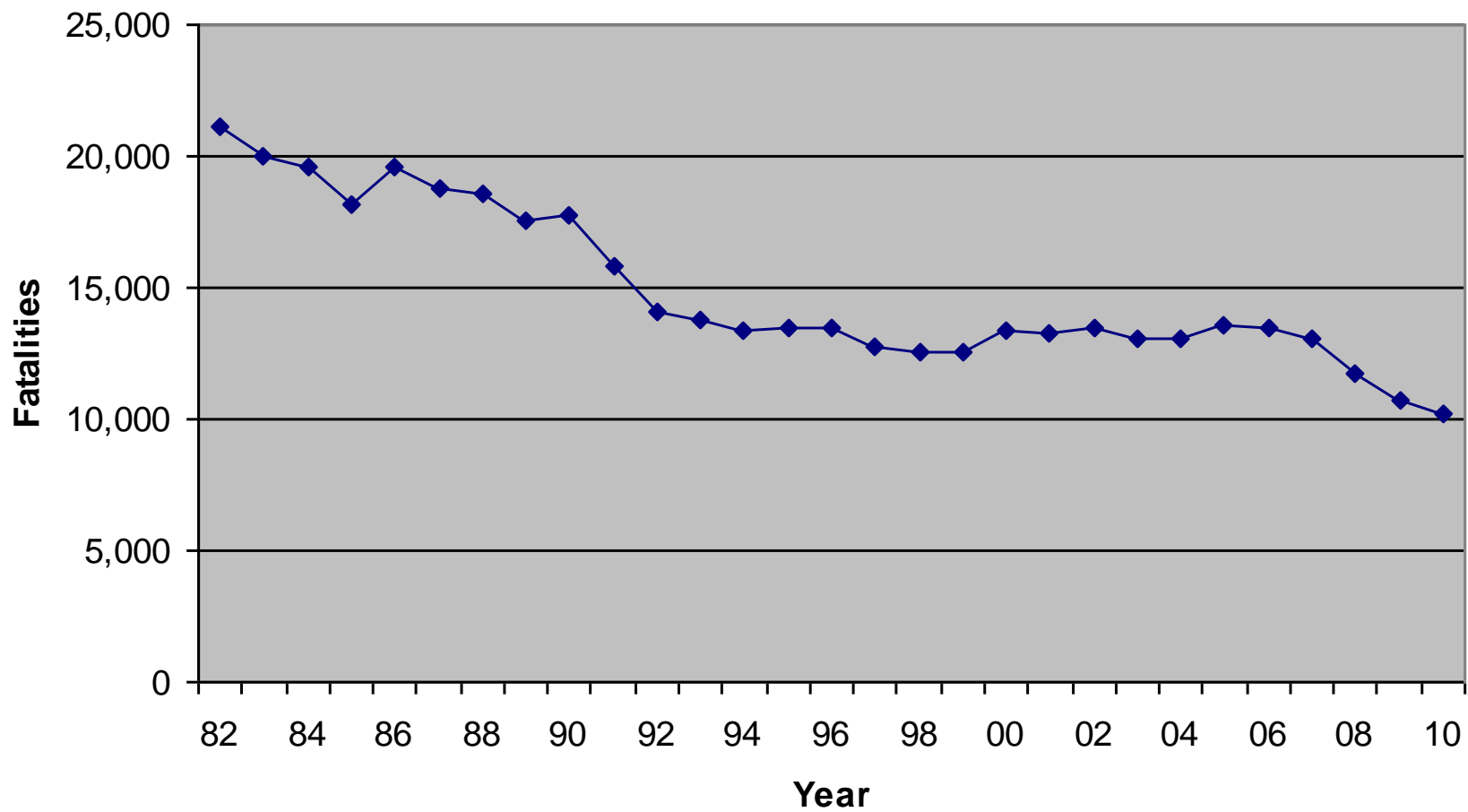
# Crash risk by age and sex, 1996-97 and 2006-07



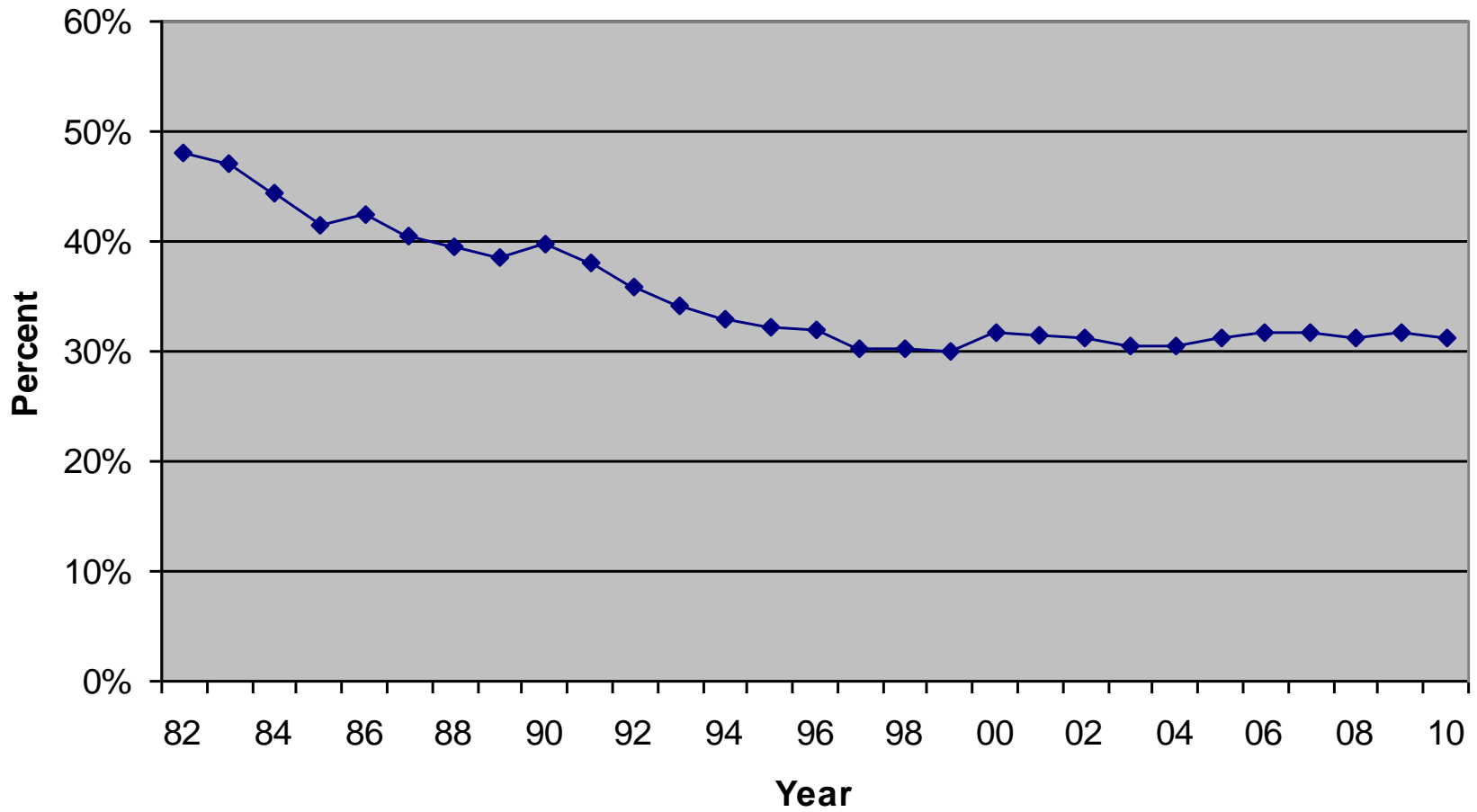
# Consequences of chemistry and effects

- Laws
  - “Impaired” – subjective judgment
  - *Per se* – objective measurement
- BAC testing
  - Breath and blood
  - Evidentiary
  - PBTs, passive sensors

## US alcohol impaired traffic fatalities - driver BAC .08+



## Percent of US traffic fatalities - driver BAC .08+



# What can be done?

- Prevention and education: don't drink, don't drink and drive
  - Drinking age 21 laws, dram shop laws, server training
  - Communications: MADD innocent victims, designated driver
- Intervention: keep drinkers from driving
  - Alcohol interlocks
- Deterrence: DWI laws, enforcement, sanction
  - Change behavior through fear or consequences
  - Deterrence theory: certain, swift, severe

# What works?

- Prevention and education
  - We will drink
  - Some social norms change:  
“one for the road” now “designated driver”
  - But we will continue to drink
- Intervention
  - Alcohol interlocks: effective while on the car

# What works?

- Deterrence

- Most effective, most effort and resources
- Key: consequences must be certain, swift, and severe
- Certain?

Chance of arrest less than 1 in 50 trips with BAC .08 +

- Swift?

Arrest to charge to court date to continuance to another continuance to sentence to appeal to ...

- Severe?

Charges dismissed or reduced (wet reckless, diversion, ...)



# Effective strategies to move forward

- Prevention and education valuable to support deterrence
  - Education alone feels good but largely ineffective
  - Examples: seat belt use; war on drugs
  - PSA = People Sound Asleep
- Intervention limited at present, has long-term promise
  - DADSS: unobtrusive automatic interlocks
- Deterrence effective with commitment, resources, and total system approach
  - Increase perceived risk of detection (e.g., checkpoints, publicity)
  - Increase swift and certain sanctions (e.g., administrative license revocation)

# Effective strategies to move forward

- There is no silver bullet, no simple solution
  - Every difficult issue has a solution that is simple, quick, cheap, and completely ineffective
  - Separating the All-American behaviors of drinking and driving is hard work
  - It requires resources, commitment, and time

# Questions

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